APPLE-CILLIN II
diagnostic utility
Version 2.1

developed by
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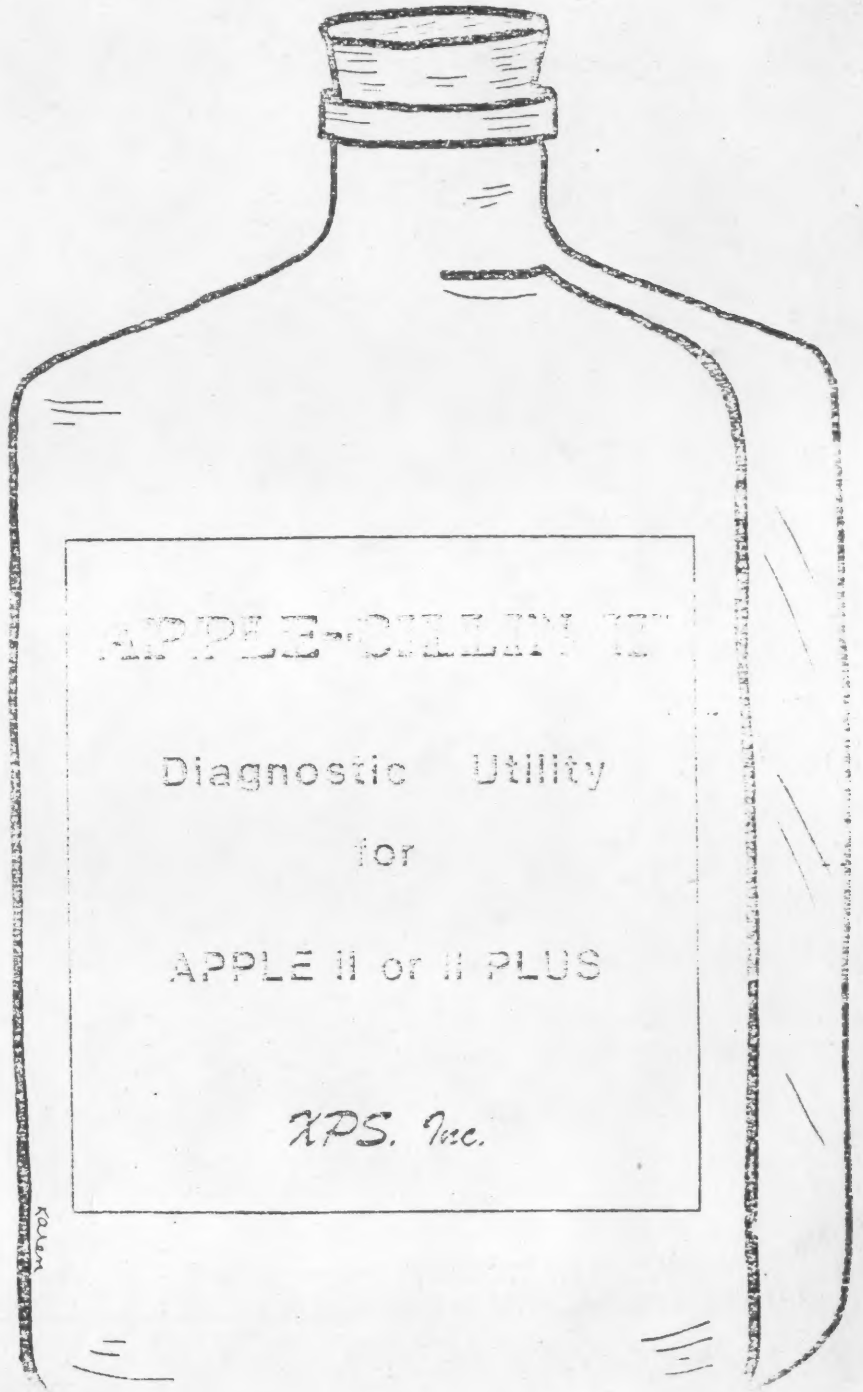

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INTRODUCTION

APPLE-CILLIN II is a new and improved version of the original APPLE-CILLIN. The improvements in the new version are the direct result of comments and suggestions we received from many of the users of the original APPLE-CILLIN.

APPLE-CILLIN II is a comprehensive diagnostic system for the Apple II or Apple II+ computer system. It tests twenty-seven hardware functions. All of these tests can be set to run automatically one right after the other. The results of the test can be printed out on your printer providing a permanent record of the status of your Apple.

APPLE-CILLIN II has 7 disk system tests including a DISK SPEED TEST that can detect speed variations as small as .0175% in your disk drives. ALL of the disk system tests can be performed on ANY DRIVE in ANY SLOT. In addition, APPLE-CILLIN II will BOOT FROM ANY DRIVE.

APPLE-CILLIN II is completely MENU-DRIVEN. It is even FASTER and EASIER TO USE than the original. APPLE-CILLIN II has also been designed to reduce the requirements placed on your Apple to make it function. APPLE-CILLIN II loads and runs in the lowest 16K of memory. This means that if this ONE section of memory is functional, you can analyze problems with the rest of the system.

We are very excited about APPLE-CILLIN II. It is almost a completely new system (a few screens are similar to the original). We could go on and on about its many features, but we must end this introduction here by saying THANK YOU to the many users of the original whose suggestions have made this NEW APPLE-CILLIN II possible.

TRADEMARKS

APPLE][, APPLE][PLUS, DISK][, APPLE-SOFT are trademarks of Apple Computer Inc. APPLE-CILLIN II is a trademark of XPS, Inc.

COPYING APPLE-CILLIN II

Copying APPLE-CILLIN II without the written consent of XPS, Inc. is prohibited by law. If your APPLE-CILLIN II diskette becomes damaged, check the warranty instructions in the back of the manual for replacement procedures.

SYSTEM REQUIREMENTS

APPLE-CILLIN II requires at least 16K of RAM memory, and at least 1 DISK][drive. It assumes that you are using the standard 40 column display. APPLE-CILLIN II assumes that your printer card does not echo characters to the screen. Printing results with a printer card which echos characters may produce unpredictable results.

ORGANIZATION OF MANUAL

APPLE-CILLIN II is menu-driven. This means that every function performed by APPLE-CILLIN II is selected from a menu by you the user. This manual will discuss each function and feature of the product in the same order as they appear on the menus.

USING APPLE-CILLIN II

APPLE-CILLIN II is written completely in assembly language. It therefore does not require a

language to be present in your Apple. It is also designed to run very rapidly. Because of these two factors, your APPLE-CILLIN II Diskette MUST BE BOOTED!

TO BOOT APPLE-CILLIN II

If you have an Apple II or Apple II+ with an auto-start ROM simply place the APPLE-CILLIN II disk into the NORMAL BOOT DRIVE for your system and turn on the Apple.

If you have an Apple with a monitor ROM, turn on the Apple, place the APPLE-CILLIN II disk in the desired drive and type the slot number of the drive followed by CONTROL-P and the RETURN KEY.

If you wish to boot APPLE-CILLIN II while in BASIC (for instance if you have a memory or language card and wish to check that it loads properly you can boot the Apple Sytem Master and then use APPLE-CILLIN II to do a "ROM CARD" check on what the system master has loaded into the language card), simply place the APPLE-CILLIN II disk in the desired drive and type: PR# (slot number of card for desired drive) followed by the return key.

SIGNIFICANCE OF THE BOOT DRIVE

APPLE-CILLIN II LOADS TEST MODULES FROM DISK AS THEY ARE SELECTED. THE DRIVE IN WHICH APPLE-CILLIN II WAS BOOTED IS THE DRIVE THAT WILL ALWAYS BE USED TO LOAD THESE TEST MODULES.

AS A SAFETY PRECAUTION, APPLE-CILLIN II WILL MAKE FIVE ATTEMPTS TO READ A MODULE FROM THE BOOT DRIVE AND IF UNSUCCESSFUL, WILL TURN OFF THE DRIVE CLEAR THE SCREEN AND RETURN YOU TO BASIC.

MAIN-MENU

The MAIN-MENU has seven choices listed. These are:

1- RAM MEMORY
2- ROM MEMORY
3- DISK II SYSTEM
4- OTHER TESTS
5- LINK GROUP OF TESTS
6- SET/CLEAR RESULT PRINT OUT
X- END TEST SESSION

We will cover each selection in order.

You will notice towards the bottom of the screen a PROMPT LINE asking you to type the key for your choice. At the end of this line is a flashing asterisk. This is a target indicating that the system expects a one key entry followed by a carriage return. If you type an incorrect number or letter and wish to change it before you type the return key, use the LEFT ARROW KEY to back-space the cursor. The character you typed will be replaced by the asterisk target.

Now, let's go over each of your choices. This will be brief since what the MAIN-MENU does is to allow you to select from broad categories each of which has its own DETAIL MENU.

1- RAM MEMORY

This choice links to a DETAIL MENU from which you can choose any of four RAM memory tests. You would choose number 1 if you wished to test the RAM chips in any portion of your Apple. This includes RAM chips on the mother board, and language or memory cards in ANY SLOT.

2- ROM MEMORY

This choice links to a DETAIL MENU from which you can choose any of three ROM memory tests. You would choose number 2 if you wish to check the ROM's on the mother board, a ROM CARD in SLOT-0, a memory or language card in SLOT-0 that you have previously loaded using your system master or EXPANSION ROM's on a card in any slot.

3- DISK II SYSTEM

This choice links to a DETAIL MENU from which you can choose any of seven DISK SYSTEM tests. You would choose number 3 if you wish to check the DISK DRIVES in your system.

4- OTHER TESTS

This choice links to a DETAIL MENU from which you can choose any of seven GENERAL TESTS. You would choose number 4 if you wish to check the PERIPHERAL CARDS, the KEYBOARD, the CRT (VIDEO MONITOR OR TV), the PRINTER, the cassette TAPE SYSTEM, the GAME CONTROLLERS or the CPU chip.

5- LINK GROUP OF TESTS

This choice links you to a DETAIL MENU that contains a list of all the test selections available. Using this menu you will be able to "LINK" any or all tests together so that they will run one after the other without further need for your choosing them.

6- SET/CLEAR RESULT PRINT OUT

This choice links you to a screen that allows you to enter the slot number of the printer to which you wish the results of the next test or next group of tests to be sent. It also allows you to turn off the printout option if it is already in effect.

X- END TEST SESSION

When you choose selection X there is a two second delay followed by the screen clearing and the BASIC prompt appearing. The memory has been cleared to allow proper functioning of BASIC and the BASIC in the mother board ROM's is active. Since APPLE-CILLIN II does not use DOS, you will have to BOOT DOS before any DOS command is active.

RESET KEY

You will discover that if you accidentally press the RESET KEY during any test, the system returns to the MAIN-MENU. This choice allows you to "get out of the program" without having to turn off the Apple.

RAM TESTS

The RAM TESTS available to you from the RAM TEST menu all function in a similar manner. With these tests, you will be able to check every address on the mother board (including page-0 and page-1, the stack). ALL RAM TESTS ARE NON-DESTRUCTIVE. This means that before testing a memory location its present contents are saved and then restored after the location has been tested.

On each RAM TEST screen is an indicator showing the address of the memory location being tested. This indicator will change very rapidly during testing (it will stop when the test is linking to another test). This changing number is an indication that the program is functioning properly.

The bottom half of the screen is devoted to messages. If a memory location tests bad its status will be displayed in this area. Only this area of the screen will scroll and the scrolling can be suspended using the CONTROL-S key to freeze the display and any key to restart it.

The error message consists of the following:

The HEXADECIMAL ADDRESS of the defective memory cell.

The ORIGINAL CONTENTS of the memory cell (HEX).

The TEST VALUE written to it when the error was detected (HEX).

The value that read BACK (should be the same as the TEST VALUE if the memory cell was not defective).

The ORIGINAL CONTENTS of the memory cell that was put back.

The final contents of the cell read BACK after the attempt was made to restore the cell to its original condition.

NOTE: One completely defective or missing memory chip will cause 16384 error messages to be displayed (or printed out if in print-out mode).

NOTE: All memory tests (when not linked to another test) repeat continuously until you press the ESC (ESCAPE) key. This means that you can run the tests for as long as required to locate an intermittent problem.

There are four RAM memory tests. Two of these tests are devoted to the mother board. The first one tests the low address range from address zero to address $2000. This range includes page-0, the stack, screen memory and the starting portion of Applesoft program storage. Since the test is non-destructive, the screen does not change much. If you watch closely, as the address indicator moves from 0400 thru 07FF there will be white marks flash randomly accross the screen.

The second mother board ram test tests the high address memory of your Apple. It includes every location not tested by the low address range test. Using these two tests EVERY memory cell is tested.

There are two more RAM TESTS which are devoted to testing LANGUAGE or MEMORY-EXPANSION cards. One of these tests allows you to test a memory card in a selected slot. You would use this to check one memory card repeatedly. The other test scans all 8 slots in your Apple. When it finds a memory card it tests it. If the slot has no card, you'll hear a beep and see a message to that effect. When all slots have been scanned, it starts over at slot-0 and scans them all again until you type the ESC key (only one scan pass is made if the test is linked to another test).

ROM TESTS

There are three ROM TESTS which function in a similar manner, but on different targets. All ROM tests have the current address indicator that displays addresses as they are checked. All ROM TESTS repeat continuously until you type the ESC key (unless linked to another test in which case one test pass is made).

The MOTHER BOARD ROM test checks the ROM's located on the mother board. It performs repeated check sums on each ROM. It then displays the START address of the ROM the CHECK SUM or TEST VALUE found in that ROM, If the ROM address space is empty that fact is announced (along with a 0 test value), if the test value matches the correct value for a known ROM, the NAME of the ROM is displayed. If the ROM is present, but produces a test value that does not match a known ROM, this fact is displayed.

The ROM CARD test checks ROM or MEMORY cards in slot-0. The test results and operations are identical to the mother board test. If you have booted APPLE-CILLIN II after first booting the system master, a language or memory card in slot-0 should display the expected results for the loaded language.

The EXPANSION ROM test scans slots 1 thru 7. If an EXPANSION ROM (Address space $C800 - $CFFF) is found, it is tested. The results for each slot are displayed. If no ROM is present in the slot, it is shown as MISSING and has a test value of 0. If a ROM is found on a slot it is announced as PRESENT and the TEST VALUE is displayed. You should record this number for each EXPANSION ROM you have in your system (use the results print-out feature if you have a printer). Whenever this test is run,

the results for a given rom should NOT CHANGE. If the results change, it indicates a defect in the ROM or the system's communication with that rom (dirty edge connector on the card etc.).

DISK II SYSTEM

There are SEVEN DISK SYSTEM TESTS. All of these tests can be USED WITH ANY SLOT/DRIVE combination. Un-predictable results will occur if the chosen slot/drive does not represent an actual disk drive. If this is done, you should turn off the Apple and reboot the system. Because of this, you will be asked to verify (Y/N) both your slot choice and drive choice. In addition before any test begins you must type the letter 'S' (as indicated on the screen for that test) to start the test.

The DISK FORMAT test is used to prepare a disk for use with the other disk system tests (no prep needed for disk used with speed test). It first formats the disk in the appropriate format (13 or 16 sector / DOS 3.2 or DOS 3.3). It then writes data to every sector on the disk. The formatting terminates on any error that occurs during the format or write phase (disk is certified as read/write valid on all sectors when test is finished).

NOTE: This disk formatting is identical to the normal DOS you use EXCEPT that TEST DATA HAS BEEN WRITTEN TO EVERY SECTOR. THIS DISK WILL NOT BOOT AND MUST BE INITIALIZED IN THE NORMAL MANNER PRIOR TO ITS USE WITH DOS.

Four of the disk tests perform in a similar manner. They read and or write test data on each sector of the test disk and report the pass-fail status of each sector. They also report the precise error as it occurs. They also display the track and sector of the disk that is being affected by the test.

Two of the tests operate sequentially from track 0 to track 34 (all 35 tracks). The other two tests operate by "randomly" selecting the track. There should be no hesitations or errors during the random head stepping of this test. If there is it indicates that the drive is having problems positioning the read/write head correctly.

The final disk read test is the TRACK-SEEK test. This test randomly reads one hundred sectors on the disk. It is a quick test to find problems with accurate head positioning. The results displayed by this test show the number of bad tracks seeks in one hundred attempts.

The remaining disk system test is the DRIVE SPEED test. This test can be used to check or adjust (if you feel qualified to handle the task) the speed of any drive in your Apple system.

This test requires the use of a diskette which will have to be reinitialized after using this test. DO NOT USE A DISKETTE THAT HAS DATA YOU WISH TO ACCESS IN THE FUTURE - THE DATA WILL BE LOST FOREVER!

After choosing the drive on which to perform the test, place a disk in the drive and start the test. The screen will indicate the speed variation of the drive from ideal. This display is in HEX. Each unit deviation from zero represents a speed variation of .0175% from ideal. Above this digital indicator is an indicator that moves from left to right on the screen (depending on whether the drive is slower or faster than it should be). The symbol moves one character position at a time. Each

hyphen above the symbol represents a speed variation bracket of .5% from the ideal. The symbol moves all the way to left and right of the screen, but wide variations from normal can be indicated digitally with the "needle" pinned at either side of the screen.

NOTE: THE DISK IN THE TEST DRIVE MUST BE WRITEABLE (NOT WRITE PROTECTED) OR THE TEST WILL PRODUCE RANDOM RESULTS.

OTHER TESTS

The OTHER TESTS menu gives you a choice of seven additional system functions that can be tested. These are:

PERIPHERAL CARDS

This selection is a test of each slot in your Apple to determine the contents of the slot. If a slot contains a memory or language card this fact is displayed (along with an FF test value. Language and memory cards are located but NOT TESTED. If a slot is empty this fact is displayed along with the test value 00. If the test value for a card agrees with that of one recognized for the system, the card name is displayed along with its test value (more than one card could have the same test value so if the card in a given slot is identified incorrectly it may be because of this fact). If a card is found and its test value is not recognized by the system the display indicates UNKNOWN as the card name along with the test value. The test value should be recorded. Any time this test is done, the test value for this card should be the same. See Appendix A for a list of cards recognized by APPLE-CILLIN II.

KEYBOARD TEST

The KEYBOARD TEST allows you to test the operation of every key (except of course the reset key). The test screen shows each key on the keyboard (SM= shifted M, SPC= space bar). When you strike a key it's letter on the screen will disappear. If the key is struck after its letter is gone, you will hear a beep. If you get the beep but the character is still on the screen, it could be an indication that the key is being encoded improperly.

Any letters left on the screen that won't disappear by typing its key means the keyboard is not sending the correct code to the system. To exit from this test, type the ESC (Escape) key three times in a row (the beeping is normal in this case).

CRT TEST

The CRT TEST is a means of displaying test patterns on your video monitor or TV. The names of the patterns are self explanatory. This test has its own menu and to exit the test you use the 0 selection.

NOTE: APPLE-CILLIN II uses the area of memory allocated to the HIRES screen #1 for its DOS. Because of this, upon completion of the CRT TEST you will not see the MAIN-MENU immediately reappear on the screen. Instead the APPLE-CILLIN II DOS WILL BE RELOADED. IF APPLE-CILLIN II CANNOT RELOAD THE DOS, IT WILL LET THE DISK DRIVE SPIN - FOREVER.

PRINTER TEST

The PRINTER TEST prints a "barber pole" pattern to your printer. All characters are sent to the printer and should appear on the paper as a barber pole pattern.

If this test is performed as part of a group of linked tests, the printer selected from the main menu will receive the output. The test will send 50 lines of test pattern to the printer and then link to the next test or menu if this test is the last one in the group.

If this test is performed as an individual selection then you will be asked for the slot number of your printer interface card. You may enter any slot from 1 to 7. However, because of the variety of cards available, no check is made on the validity of your slot entry. Unpredictable results may occur if there is no printer card in the selected slot or if the card in the slot is not the one attached to your printer.

TAPE DECK TEST

The TAPE SYSTEM TEST is provided so that you can quickly test the function of your cassette tape system. The test writes a short pattern to the cassette drive. You can then use the test to verify the test pattern. The screens associated with this test should be self-explanatory.

GAME CONTROLS

This test provides a display of the status of all game controller inputs to the system (whether there is anything connected to them or not).

The controller displays have a range of 0 to 255. If you do not have a controller connected to an input then its display will indicate 255 - CLOSED.

You should use this test to verify the proper action of your game controller system.

CPU TEST

The CPU TEST checks the central processor chips registers. Each register is checked for its proper operation. If there is a problem during this test, the memory test should be performed, since there is an interaction between memory and the test. In addition, depending upon what defect is found, the results display could be effected.

LINKING GROUP OF TESTS

APPLE-CILLIN II is designed so that the entire test process can be automated. The link group of tests menu shows an abbreviated name for each test available in the system along with an associated key. Here's how easy it is to link one, two or all the tests together:

Type the key asociated with the test you want to link into your test group. The test name and its letter will immediately be reprinted on the screen as black letters on a white background (INVERSE). If you make a mistake and don't want that test in the group, simply type its letter again. Immediately the letter and test name are reprinted in normal fashion (white letters on black background).

All of the tests on the screen that are displayed in black letters on a white background are "linked" into a group of tests that will be performed one right after the other. Those tests not displayed in INVERSE are NOT part of the test group.

To begin the group of tests simply type the letter Z. If you change your mind and don't want to do a group of tests (perhaps you want to print the results and aren't sure if the system is in result print mode), simply type the letter X. You will be returned to the menu. However, the group of tests are still defined and the next test you perform will cause the entire group to be done.

SET/CLEAR RESULT PRINTOUT

This menu selection allows you to specify the slot to which you want the test results to be sent or to "turn off" the results going to a printer. This menu selection may be used any time you have the MAIN-MENU on the screen.

Once you select to have the results go to a printer, any test or group of tests that you perform will have the results printed out. When the system returns to the main menu FROM THE TEST OR GROUP OF TESTS the printout is turned off.

NOTE: Unpredictable results occurr if the slot you choose has no card or a non-printer card present.

END TEST SESSION

This selection is provided so that you can leave APPLE-CILLIN II without turning off the Apple. If you have an Apple with autostart, when

you press the reset key the system returns to the main menu.

When you choose this selection, the memory is cleared for whichever Basic is on the mother board, the screen is cleared and Basic is "cold started". Since APPLE-CILLIN II does not use DOS, when the Basic prompt appears you have basic active, but must boot DOS if you wish to use the disk system.

HANDLING AND SAFETY PRECAUTIONS

When handling your system hardware, it is best to observe some simple precautions. These are both for your own protection, and the protection of your equipment.

1) TURN OFF YOUR APPLE WHEN REMOVING OR INSTALLING CARDS OR COMPONENTS. Better still, unplug it. Failure to observe this rule will cause damage to your cards or mother-board.

2) WATCH OUT FOR STATIC ELECTRICITY. Try not to work on rugs or other surfaces which tend to produce static. Static discharges can destroy memory chips and other components.

3) ALWAYS USE A CHIP PULLER TO REMOVE COMPONENTS FROM THEIR SOCKETS. This will prevent bent and broken leads which would render a part useless.

4) WHEN REMOVING OR INSTALLING A COMPONENT, BE SURE TO OBSERVE ITS PHYSICAL ORIENTATION. It is very easy to plug a chip in backwards which usually results in immediate destruction.

5) DO ONLY THOSE THINGS THAT YOU FEEL CAPABLE OF DOING. It is easy to put more bugs in equipment by mishandling and poor technique.

6) DO NOT TRY TO REPAIR A TV OR VIDEO MONITOR UNLESS YOU ARE EXPERIENCED WITH HIGH VOLTAGE CIRCUITS. The voltages in a video display are DEADLY -- EVEN WHEN THE UNIT IS TURNED OFF AND UNPLUGGED.

RAISING THE DEAD

Sooner or later you may find that your Apple refuses to boot any disk including APPLE-CILLIN II. When this occurs, you can either take your computer to a service center, or you can try the following procedures. DO NOT PERFORM THESE PROCEDURES UNLESS NONE OF YOUR DISKS WILL BOOT. If some of your disks will boot, but APPLE-CILLIN II will not, it is possible that you have a damaged APPLE-CILLIN II disk. In this case contact XPS per the warranty procedures for a replacement. Make sure you read the section about precautions and handling before performing these procedures.

1) Turn off the Apple and then turn it back on. If the Apple beeps when it is powered up, go to step 2. If no beep sounds when the Apple is powered up, go to step 6.

2) Insert the APPLE-CILLIN II diskette in your disk drive and perform your boot procedure. If the disk drive spins, go to step 3. If the drive does not spin, go to step 8.

3) If APPLE-CILLIN II's main menu comes up, run the diagnostics. If the main menu does not come up within 20 seconds, do step 4.

4) TURN OFF THE COMPUTER and remove the disk controller card. Using isopropyl alcohol and a clean cotton cloth, clean the edge connector on the controller card. Re-install the controller card and try to boot APPLE-CILLIN II again. If APPLE-CILLIN II now boots, run the diagnostics. If it still does not boot, go do step 5.

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1) Turn off the Apple and then turn it back on. If the Apple beeps when it is powered up, go to step 2. If no beep sounds when the Apple is powered up, go to step 6.

2) Insert the APPLE-CILLIN II diskette in your disk drive and perform your boot procedure. If the disk drive spins, go to step 3. If the drive does not spin, go to step 8.

3) If APPLE-CILLIN II's main menu comes up, run the diagnostics. If the main menu does not come up within 20 seconds, do step 4.

4) TURN OFF THE COMPUTER and remove the disk controller card. Using Isopropyl alcohol and a clean cotton cloth, clean the edge connector on the controller card. Re-install the controller card and try to boot APPLE-CILLIN II again. If APPLE-CILLIN II now boots, run the diagnostics. If it still does not boot, go do step 5.

5) TURN OFF THE APPLE and swap the two rows of memory chips closest to the keyboard. Turn on the Apple again and try to boot APPLE-CILLIN II. If it now boots, run the diagnostics. If it still does not boot, it is probably best to take your machine to a service center for repair.

6) TURN OFF THE APPLE and remove all of the cards from their slots. Turn on the computer and listen for the beep. If it now beeps when powered up, go on to step 7. If it does not beep when powered up, turn it off again, re-install the disk controller card and go to step 5.

7) Re-install the disk controller card and power up the computer. If the computer does not beep when powered up, you probably have a bad disk controller card. If it does beep, one of your other cards is probably defective. Re-install them one at a time, testing for the power up beep each time. This should tell you which card is bad. DO NOT go to step 8.

8) TURN OFF THE COMPUTER and remove the disk controller card. Clean the edge connector with isopropyl alcohol, and re-install the card. Try to boot the APPLE-CILLIN II disk. If the disk now boots, perform the diagnostics. If the disk does not boot, do step 9.

9) If you have two disk drives, swap drives 1 and 2 then try to boot APPLE-CILLIN II. If it still will not boot, then goto step 5. If it now boots, you most likely have a bad drive.

APPENDIX A

Peripheral cards recognized by APPLE-CILLIN II

TYPE	MANUFACTURER
Parallel Interface	Apple Computer Inc.
Serial Interface	Apple Computer Inc.
Communications Card	Apple Computer Inc.
Language Card (16K RAM)	Apple Computer Inc.
Disk][(13 Sector)	Apple Computer Inc.
Disk][(16 Sector)	Apple Computer Inc.
7710A Serial Interface	CCS, Inc.
16K Memory Card	Microsoft Inc.
16K Memory Card	Andromeda Inc.
32K Memory Card	Saturn Systems Inc.

APPENDIX B
Converting Hexadecimal numbers to Decimal

Since all of APPLE-CILLIN II's numeric displays are in "Hexadecimal" (base 16), it may be necessary to convert a HEX number to decimal. Here's how:

First, HEX numbers use the digits 0 through 9 and the letters A through F to represent a value from 0 to 15. 0 through 9 are exactly equal to their decimal counterparts. The letter A however is used to represent the decimal value 10, B is used for 11, C for 12, D for 13, E for 14, and F for 15.

To convert a number from HEX to decimal, start with the leftmost digit and multiply it's decimal value by 16. Then add the decimal value of the next digit and multiply the total by 16. Continue until you have added in the value of the last digit, but do not perform the last multiply. The total is your answer. For example, to convert A7BE to decimal:

A = 10 ; 7 = 7 ; B = 11 ; E = 14

A * 16 = 160
160 + 7 = 167
167 * 16 = 2672
2672 + 11 = 2683
2683 * 16 = 42928
42928 + 14 = 42942 (Our decimal answer)

APPENDIX C
Peripheral Card Test Values

Use this space to record the test values from your peripheral cards when you are sure that your cards are working properly.

PERIPHERAL CARD	TEST VALUE

LIMITED WARRANTY

APPLE-CILLIN II Diagnostic Disks are warranted for a period of one (1) year from the date of purchase to be free of defects in materials and workmanship. If a defect occurs within one (1) year, XPS, Inc. will replace the defective disk without charge except for a sum of Three ($3.00) Dollars to cover return postage and handling.

APPLE-CILLIN II and the accompanying materials are sold "AS IS" without warranty as to their performance. The entire risk as to the quality and performance of this product is assumed by the purchaser.

THIS LIMITED WARRANTY DOES NOT INCLUDE ANY RESPONSIBILITY FOR CONSEQUENTIAL DAMAGES CAUSED BY A DEFECT IN THE MATERIALS OR WORKMANSHIP OF THE APPLE-CILLIN II DISK. XPS, INC. DOES NOT ASSUME ANY RESPONSIBILITY OR LIABILITY FOR DESTRUCTION OF DATA, COMPUTER DAMAGE OR DAMAGE TO ASSOCIATED EQUIPMENT OR MEDIA USED WITH THE EQUIPMENT.

ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF FITNESS AND MERCHANTABILITY, ARE LIMITED IN DURATION TO A PERIOD OF ONE (1) YEAR FROM DATE OF PURCHASE. Some States laws do not permit limitations on the duration of an implied warranty, so the above limitations may not apply to you.

This Limited Warranty is applicable only to the original purchaser of the APPLE-CILLIN II diskette.

To obtain service pursuant to this Limited Warranty within the warranty period, mail the APPLE-CILLIN II disk postage prepaid, along with a letter explaining the nature of the defect, and Three ($3.00) Dollars to cover return postage and handling to:

XPS, Inc., 323 York Road, Carlisle, PA 17013